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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

43359

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

10/069392

INTERNATIONAL APPLICATION NO.

PCT/EP00/08643

INTERNATIONAL FILING DATE

September 5, 2000

PRIORITY DATE CLAIMED

September 7, 1999

TITLE OF INVENTION

GEAR PUMP WITH A DRIVE AND A HYDRAULIC TANK

APPLICANT(S) FOR DO/EO/US


Harald KLAHM and Rudiger JUNG

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 10/069392		INTERNATIONAL APPLICATION NO. PCT/EP00/08643		ATTORNEY'S DOCKET NUMBER 43359	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	10 - 20 =	0	X \$18.00	\$	
Independent claims	1 - 3 =	0	X \$84.00	\$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$	
Reduction of 1/2 for filing by small entity, if applicable.				\$	
SUBTOTAL =				\$ 890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$ 40.00	
TOTAL FEES ENCLOSED =				\$ 930.00	
				Amount to be refunded:	\$
				charged:	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>930.00</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>18-2220</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: Roylance, Abrams, Berdo & Goodman, L.L.P. 1300 19th Street, N.W., Suite 600 Washington, D.C. 20036 (202) 659-9076					
				 SIGNATURE:	
				Mark S. Bicks	
				NAME	
				28.770	
				REGISTRATION NUMBER	

43359

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
:
Harald KLAHM et al. :
:
Serial No.: : Group Art Unit:
:
Filed: Herewith : Examiner:
:
For: GEAR PUMP WITH A DRIVE AND A :
HYDRAULIC TANK :

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Preliminary to examination and calculation of the filing fee, please amend the above-identified application as follows:

In the Claims

Amend claims 3, 6, 8, 9 and 10 as follows:

3. (Amended) The device as specified in Claim 1, *wherein* the gears (22) of the external gear pump (20) are contained in a pump chamber (24) of the coupling piece (14) and are driven in rotation in bearing bushes of the coupling piece (14).

6. (Amended) The device as specified in Claim 1, *wherein* an electric motor, in particular a rotary current motor (36) or a direct-current motor (38) or a hydraulic drive is provided as drive mechanism (12).

8. (Amended) The device as specified in Claim 1, *wherein* the drive mechanism (12) together with its drive line (48) may be coupled to the hydraulic pump (10), and *wherein* a fluid seal (50) is present, at least at the site of the drive line (48).

9. (Amended) The device as specified in Claim 1, *wherein* the external gear pump (20) is situated together with its gears (22) in a vertically extending central plane of the flange-like coupling piece (14) and *wherein* the drive shafts for the gears (22), together with the longitudinal axis of the drive line (48), lie in planes transverse to the longitudinal central plane indicated.


10. (Amended) The device as specified in Claim 1, *wherein* the hydraulic tank (16) represents a closed structural unit and *wherein* only the fluid contents of the hydraulic tank (16) are used to supply a consuming device to be actuated.

REMARKS

The above changes eliminate multiple dependency in the claims.

Respectfully submitted,

Dated: Feb 26, 2002



Mark S. Bicks
Reg. No. 28,770

Roylance, Abrams, Berdo & Goodman, L.L.P.
1300 19th Street, N.W., Suite 600
Washington, D.C. 20036
(202) 659-9076

11/31/2001

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EP0008643

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2. The device as specified in Claim 1, *wherein* the gears (22) of the external gear pump (20) are fully contained in and integral with the coupling piece (14).
3. The device as specified in Claim 1 ~~or 2~~, *wherein* the gears (22) of the external gear pump (20) are contained in a pump chamber (24) of the coupling piece (14) and are driven in rotation in bearing bushes of the coupling piece (14).
4. The device as specified in Claim 3, *wherein* a suction line (26) connects the interior of the particular hydraulic tank (16) connected to the interior of the pump chamber (24) so that fluid may be conveyed.
5. The device as specified in Claim 4, *wherein* a feed line (30) inside the coupling piece (14) discharges into the pump chamber (24), and *wherein* a tap line (34) opening into the feed line (30) serves the purpose of pressure relief safety.
6. The device as specified in ~~one of Claims 1 to 4~~, *wherein* an electric motor, in particular a rotary current motor (36) or a direct-current motor (38) or a hydraulic drive is provided as drive mechanism (12).
7. The device as specified in Claim 6, *wherein* the electric motor is contained as a suboil motor in the hydraulic tank (16).

AMENDED SHEET

8. The device as specified in ~~one of Claims 1 to 7~~, wherein the drive mechanism (12) together with its drive line (48) may be coupled to the hydraulic pump (10), and wherein a fluid seal (50) is present, at least at the site of the drive line (48).
9. The device as specified in ~~one of Claims 1 to 8~~, wherein the external gear pump (20) is situated together with its gears (22) in a vertically extending central plane of the flange-like coupling piece (14) and wherein the drive shafts for the gears (22), together with the longitudinal axis of the drive line (48), lie in planes transverse to the longitudinal central plane indicated.
10. The device as specified in ~~one of Claims 1 to 9~~, wherein the hydraulic tank (16) represents a closed structural unit and wherein only the fluid contents of the hydraulic tank (16) are used to supply a consuming device to be actuated.

Flutec Fluidtechnische Geräte GmbH, Industriegebiet,
66273 Sulzbach/Saar

A Device for Pumping Fluid

The invention relates to a device for pumping fluid, with a hydraulic pump and a drive mechanism, the hydraulic pump being an external gear pump and as an independent component capable of being coupled to various types of drive mechanisms as additional components in the manner of a building block system and for this reason is in the form of a one-piece coupling piece, various hydraulic tanks, especially ones with different tank capacities, being provided as a third type of component, a particular hydraulic tank on one side being connectible to the coupling piece and the particular drive mechanism on the other, opposite side being connectible to this the coupling piece, for which purpose the coupling piece on at least one side has a flange element, and sealing means being provided between coupling piece and drive mechanism as well as the hydraulic tank.

DE-A-195 14 749 describes a device for pumping fluid with a radial piston pump as hydraulic pump and a drive mechanism for driving the pump.

The conventional device is likewise modular in structure in the manner of a building block system, the independent component forming with the radial piston pump a multipart element which is built correspondingly large axially so that the conventional pump device is on the whole large and so cannot be

used in every installation case, especially under cramped installation conditions. In addition, because of the large number of individual piston pump elements required for the radial piston pump, a certain degree of susceptibility to breakdowns in operation is natural. In view of the great variety of parts, production and use of the radial piston pump as a hydraulic pump are also expensive.

Such pump devices, which are also called pump assemblies, are used among other things for hoisting and also lowering loads by means of hydraulic mechanisms, for example, in the area of cargo platforms in trucks, automobile platform lifts, mobile elevating platforms, or the like. In the mobile motor vehicle area, in which frequently only battery power is available, direct-current motors are used as drive mechanisms, while in contrast, in the area of commercial firm installations or the like, where direct current is available, the relevant pump device with a rotary current motor is employed.

In the relevant conventional solutions (DE-U-296 01 201) a special assembly solution has been made available for each special application, one which meets the special operating requirements. Since an independent technical concept is to be made available for each application, the known solutions are expensive to apply in production, and a large number of different structural shapes and structural components must be stocked as a function of customer requirements.

As a further development of the concept of configuring pumping devices or pump assemblies as a modular building block system, DE-A-32 27 926 proposes providing a hydraulic unit with a flangelike base plate on one side surface of which is removably fastened a hydraulic pump along with a housing tightly enclosing the pump and serving as container for the hydraulic medium, and on the other side surface, mounted removably and opposite the pump, is an electric motor whose drive shaft extends perpendicularly to the two side surfaces. In the case of this conventional solution the hydraulic pump is a component of the hydraulic tank; this circumstance reduces the storage capacity. The flange-like base plate, in contrast, is provided with drill holes, perforations, or the like which form all the connecting lines required for mounting of various hydraulic pumps, motors, valves, control elements, or the like and end on one side or peripheral surface of the flange-like base plate, where fastening means for the components and for their connection are provided. The relevant conventional hydraulic unit as a pumping device is large in size and cannot be employed in every application if the space available for mounting is especially restricted.

DE-A-196 27 405 discloses a device for pumping fluid, one having the features specified in the preamble of Patent Claim 1. The conventional pump layout consists of a hydraulic tank with a filter and external gear pump which is connected by way of a drive shaft of an electric motor as drive mechanism to this electric motor. Hydraulic tank and electric motor are mounted on opposite sides of the pump housing, which serves as coupling piece, the electric motor engaging an annular recess in an end plate on an accompanying adjustable flange of this end plate, while the hydraulic tank is held in place by a clamp on a flange-like seating surface. As viewed along a

longitudinal section following the longitudinal axis of the pump layout, the pump housing is T-shaped in outline graduated through various widths. Replacement of the hydraulic tank on the side of the coupling piece with the drive mechanism is not possible, so that the possibility of adaptation to comply with stated customer wishes is restricted.

On the basis of this state of the art the invention has the object of further improving conventional devices for pumping a fluid so that the manufacturing costs and so overall costs are reduced and so that a large number of customer wishes can be satisfied with a small number of components. The invention also has the object of developing a reliably operating pump unit, without the need for reducing the capacity of a tank container, which may also be installed under extremely cramped installation conditions in order to conserve space and yet is just as efficient as a comparable product of the state of the art. An object such as this is attained by means of a device having the characteristics specified in Claim 1 in its entirety.

As a result of the circumstance that, as specified in the descriptive portion of Claim 1, the coupling piece is in the form of a base plate, that, on its side opposite the flange element, the coupling piece has another flange element which is adapted to the first flange element from the viewpoint of its external dimensions, that both flange elements have on their outer circumference a radial recess for engagement of a sealing means which may be overlapped by the free end of the hydraulic tank involved, and that the hydraulic tank involved and the drive mechanism involved may be connected while together on one side of the coupling element, it is possible to put

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together a pump device as a compact unit for a large number of applications with the smallest possible number of components. In the process the components already available may be combined at will with each other in accordance with customer instructions to form a marketable unit. Hence the device claimed for the invention yields a building block system, equivalent parts being used to produced a large variety of different embodiments at a low cost level. In this instance the hydraulic tank may incorporate the drive mechanism and be mounted together with such drive mechanism on the side of the coupling piece provided for this purpose.

The hydraulic pump is incorporated and fully integrated into the base plate in the form of an external gear pump, so that the entire capacity of the tank unit to be connected is available. In addition, as a result of integration of the external gear pump the length of the fluid lines and control lines is reduced; such reduction is in keeping with the desire for reliability in operation with low pressure losses. The fact that the external gear pump has only two gears as actuating and drive element, this resulting in conservation of installation space and also being cost effective, also promotes reliability of operation. In addition, the external gear pump is easier to design on the basis of its volume throughput for a wide variety of applications, and it is easier to design the fuel pump on the basis of its geometric dimensions.

In addition, in the event of breakdown and for maintenance purposes, the hydraulic pump may be replaced simply by replacing the coupling piece; because of the platelike configuration of the coupling piece; because of the platelike configuration of the coupling piece, the hydraulic pump itself is easily accessible for purposes of repair and maintenance. - 5 -

Additional embodiments of the device claimed for the invention are specified in the subsidiary claims.

In what follows the device for pumping fluid is described in greater detail on the basis of an embodiment illustrated in the accompanying drawing. In a basic illustration not drawn to scale,

Figures 1 to 3 show the pump device with various drive units, partly in a sectional view and partly in a side view;

Figures 4, 5, and 6 present a sectional view along lines I - I, II - II, and III - III corresponding to the presentation in figure 1.

The device presented in the figures is used for pumping and thus delivery of fluid by means of a hydraulic pump 10 which may be powered by a drive mechanism 12. The hydraulic pump 10 as an independent modular component may be coupled with various types of drive mechanisms 12 as additional components in the manner of a building block system and for this purpose is in the form of a coupling piece element 14 on the housing. A third type of component is represented by various hydraulic tanks 16, especially ones with different tank capacities, and the particular hydraulic tank 16 being connectible on one side to the coupling piece 14 and to a particular drive mechanism 12 on the other, opposite side (cf. figures 1 and 3) or on the same side (cf. figure 2) to the coupling piece 14. In the illustration in figures 1 to 3, essentially only one type of hydraulic tank 16 is shown, one which may be refilled with fluid, especially hydraulic fluid, by way of a refill connector 18.

In accordance with the embodiment shown as a hydraulic pump 10, the coupling piece 14 has a gear pump 20 as external gear pump with two meshing gears 22 as conveying means. The gears 22 of the gear pump 20 are mounted in a pump chamber 24 of the coupling piece 14 and are rotatably guided in bearing bushes (not shown) of the coupling piece 14.

The interior of a given connected hydraulic tank 16 is connected to the interior of the pump chamber 24 by way of a suction channel 26, specifically, at the point of transition to the coupling piece by way of a suction flange 28 (cf. figures 1 and 3). In the case of the building block alternative shown in figure 2, in which the drive mechanism 12 is integrated inside the hydraulic tank 16, the suction channel 26 may be omitted and fluid delivered directly by way of the suction flange 28, which in this instance is mounted on the drive mechanism 12.

Inside the coupling piece 14, there is present in the line of vision as shown in the figures a delivery line 30 extending vertically which connects the pump chamber 24 to the exterior while conducting fluid. On the free end of the delivery line 30 extending to the exterior this line is closed by a spring loaded return valve 32, which opens by overcoming the force of the spring as soon as the hydraulic pump 10 begins operating in order to supply a consuming device such as one in the form of a hoisting device for a platform lift, automotive platform hoist, or the like with pressurized liquid. As is shown in figures 4 to 6 in particular, a branch line 34 which is connected to a pressure protection mechanism (valve) not shown in order to protect the hydraulic system from pressure peaks as overload protection discharges transversely into the delivery line 30. As is shown in figures 4 and 6, the feed

opening of the intake flange 28 discharges only partly into the pump chamber 24 with gear pump 20.

The drive mechanism 12 used is an electric motor, especially a rotary current motor 36 as illustrated in figures 1 and 2, or a direct-current motor 38 as shown in figure 3. The rotary-current motor 36 in the illustration in figure 2 is mounted inside the hydraulic tank 16 and so is an integral part of the tank. The associated pump assembly with so-called suboil motor consequently occupies less structural space, and also reduces the amount of fluid available in the hydraulic tank 16. In an embodiment not shown a hydraulic drive would also be conceivable as drive mechanism 12. As is to be seen in figures 1 to 3, the coupling 14 has on its one free end a flange element 40 that can be overlapped by the free end of the particular hydraulic tank 16, sealing means 42 in the form of a sealing ring being mounted at the location of the pertinent overlap. On the opposite side the coupling piece 14 has another flange element 44, which, in a form of the nature of a cover, may be connected to the hydraulic pump and/or to the drive mechanism 12.

By its outer dimensions the additional flange element 44 is adapted to the flange element 40 and, like the flange element 40, provides on its outer circumference a radial recess 46 for contact of the sealing means 42, provided the tank 16 is mounted on the other flange element 44 as is shown in figure 2.

The two flange elements 40, 44 have in the center an annular recess for insertion of the intake flange 28 or for introduction of the relevant drive line 48 of the drive mechanism 12. The drive mechanism 12 with its drive line 48 may thus be coupled to the hydraulic pump 10, a fluid seal 50 in the form of a ring seal being present, at least at the site of the drive line 48 inside the other

flange element 44. In this way a reliable fluid seal of the interior of the pump device from the exterior is achieved by use of the sealing means indicated.

As continuation of the modular building block system with various drive mechanisms 12, as viewed in the line of sight in the figures, a control mechanism (not shown) may be present on the top of the coupling piece 14, a mechanism which may be connected to the coupling piece 14 by way of boreholes 52. The relevant control mechanism may contain hydraulic control elements for delivery of fluid to the consuming device, as well as entire hydraulic control units. The individual components of the modular pump assembly may be connected to each other by conventional screw connections. Since the hydraulic element 16 represents a closed structural unit, the pump assembly is operated as a closed system, that is, only the fluid content of the hydraulic tank 16 is used to supply a consuming device to be actuated. Since the fluid conducting lines are integrated into the coupling piece 14, in contrast to conventional solutions no separate sealing or piping is necessary. In particular, the flange elements may be ideally produced in a cost effective manner from cast elements. The drive mechanisms 12 in question may be represented by external elements and the material embodiment of the tank 16 may be of plastic or sheet steel. The embodiment of the gear pump 20 itself may be pressure compensated or not pressure compensated.

The gear pump 20 proper with its external gears 22 lies, as viewed in the direction of sight in the figures, together with the feed line 30, in a central plane extending vertically of the flange-like coupling piece 14, and the drive shafts for the gears 22 lie, together with the longitudinal axes of the drive line 48, in planes transverse to the longitudinal center plane in question, which is represented by line II - II in figure 1 (cf. figure 5). The free end of the drive

line 48 may be in form like a connecting pin which is engaged in a recess 54 in the cylindrical drive element 56 for one of the two gears 22, it being possible for only one gear 22 to be driven in this way by the drive line 48, and the gear 22 driven in this manner entrains the other gear 22 for a pumping process by corresponding meshing of the two sets of gear teeth.

With the device claimed for the invention, the coupling piece 14 as hydraulic pump 10 is the central structural unit, which may be coupled at will to hydraulic tanks 16, drive mechanisms 12, and to control mechanisms not shown, as well as to consuming devices, to form a system solution. The coupling piece 14 is in the form of an integral solid base plate element like a mounting plate penetrated only by the feed and control lines referred to and by the gear elements of the gear pump 20. The gears 22 of the external gear pump 20 are mounted more or less in the center of the solid base plate of the coupling piece 14, so that a low-vibration drive is obtained during operation, and this condition promotes achievement of continuous feed of a stream of fluid.

Claims

1. A device for pumping fluid, with a hydraulic pump (10) and a drive mechanism (12), the hydraulic pump (10) being an external gear pump (20) and as an independent component may be coupled to various types of drive mechanisms (12) as additional components in the manner of a building block system and for this purpose is in the form of an integral coupling piece (14), various hydraulic tanks (16), especially ones with different tank capacities, being provided as a third type of component, the particular hydraulic tank (16) on one side being connectible to the coupling piece (14) and the particular drive mechanism (12) on the other, opposite, side of the coupling piece (14) being connectible to such coupling piece (14), for which purpose the coupling piece (14) has a flange component (40) on at least one side, and sealing means (42) being provided between coupling piece (14) and drive mechanism (12) and hydraulic tank (16), *characterized in that* the coupling piece (14) is in the form of a base plate, *in that* the coupling piece (14) has another flange element (44) on the side opposite the flange element (40) whose external dimensions are adapted to those of other flange element (40), *in that* both flange elements (40, 44) have on their external circumference side a radial recess (46) for engagement with a sealing means (42) which can be overlapped by the free end of the particular hydraulic tank (16) and the particular drive mechanism (12), and *in that* the particular hydraulic tank (16) and the particular drive mechanism (12) may together be connected to one side of the particular drive mechanism.

2. The device as specified in Claim 1, *wherein* the gears (22) of the external gear pump (20) are fully contained in and integral with the coupling piece (14).
3. The device as specified in Claim 1 or 2, *wherein* the gears (22) of the external gear pump (20) are contained in a pump chamber (24) of the coupling piece (14) and are driven in rotation in bearing bushes of the coupling piece (14).
4. The device as specified in Claim 3, *wherein* a suction line (26) connects the interior of the particular hydraulic tank (16) connected to the interior of the pump chamber (24) so that fluid may be conveyed.
5. The device as specified in Claim 4, *wherein* a feed line (30) inside the coupling piece (14) discharges into the pump chamber (24), and *wherein* a tap line (34) opening into the feed line (30) serves the purpose of pressure relief safety.
6. The device as specified in one of Claims 1 to 4, *wherein* an electric motor, in particular a rotary current motor (36) or a direct-current motor (38) or a hydraulic drive is provided as drive mechanism (12).
7. The device as specified in Claim 6, *wherein* the electric motor is contained as a suboil motor in the hydraulic tank (16).

8. The device as specified in one of Claims 1 to 7, *wherein* the drive mechanism (12) together with its drive line (48) may be coupled to the hydraulic pump (10), and *wherein* a fluid seal (50) is present, at least at the site of the drive line (48).
9. The device as specified in one of Claims 1 to 8, *wherein* the external gear pump (20) is situated together with its gears (22) in a vertically extending central plane of the flange-like coupling piece (14) and *wherein* the drive shafts for the gears (22), together with the longitudinal axis of the drive line (48), lie in planes transverse to the longitudinal central plane indicated.
10. The device as specified in one of Claims 1 to 9, *wherein* the hydraulic tank (16) represents a closed structural unit and *wherein* only the fluid contents of the hydraulic tank (16) are used to supply a consuming device to be actuated.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
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(19) Weltorganisation für geistiges Eigentum
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[DE/DE]; Johannisstr. 22, 66386 St. Ingbert (DE). JUNG,
Rüdiger [DE/DE]; Theresienstr. 42, 66386 St. Ingbert
(DE).

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70174 Stuttgart (DE).

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(71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme
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GMBH [DE/DE]; Industriegebiet, 66273 Sulzbach/Saar
(DE).

Veröffentlicht:

— Mit internationalem Recherchenbericht.

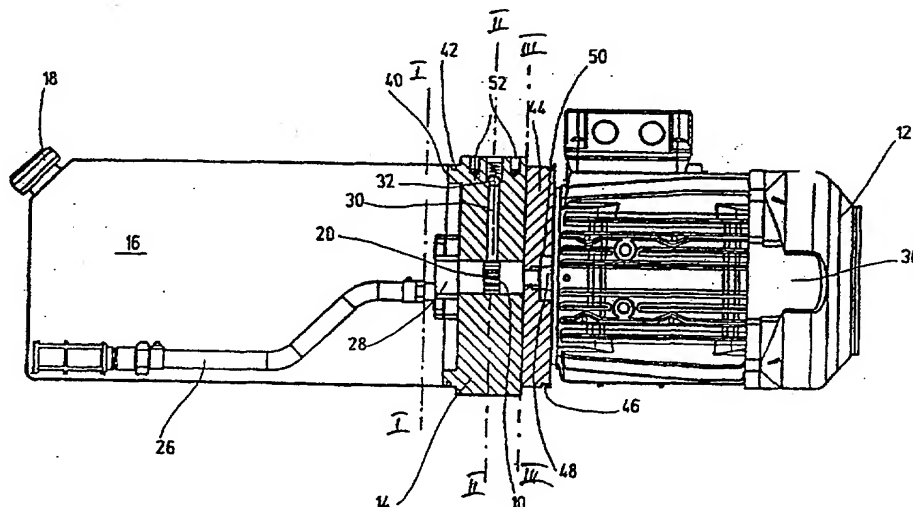
Zur Erklärung der Zweibuchstaben-Codes, und der anderen
Abkürzungen wird auf die Erklärungen ("Guidance Notes on
Codes and Abbreviations") am Anfang jeder regulären Ausgabe
der PCT-Gazette verwiesen.

(72) Erfinder; und

(75) Erfinder/Anmelder (nur für US): KLAHM, Harald

(54) Title: GEAR PUMP WITH A DRIVE AND A HYDRAULIC TANK

(54) Bezeichnung: ZAHNRADPUMPE MIT ANTRIEBSEINRICHTUNG UND HYDRAULIKTANK



(57) Abstract: The invention relates to a device for pumping fluid using a hydraulic pump (10) and a drive (12) whereby the hydraulic pump (10) is produced as an independent component with different types of drive devices (12) as additional components that can be coupled in the form of a modular system and is configured as a coupling piece (14) for said purpose. Hydraulic tanks (16) having different volumes represent a third, different type of component. Each hydraulic tank (16) can be connected on one side to the coupling piece (14) and the corresponding drive device (12) can be connected on the other side opposite to said coupling piece (14) or on the same side. The coupling piece (14) is built as a single component and embodied in the form of base plate. The hydraulic pump (10) is an external gear pump (20), whose toothed wheels (22) are received or integrated into the base plate. A compact modularly constructed building block system is thereby achieved which is functionally reliable and easy to maintain.

[Fortsetzung auf der nächsten Seite]

WO 01/18397 A1

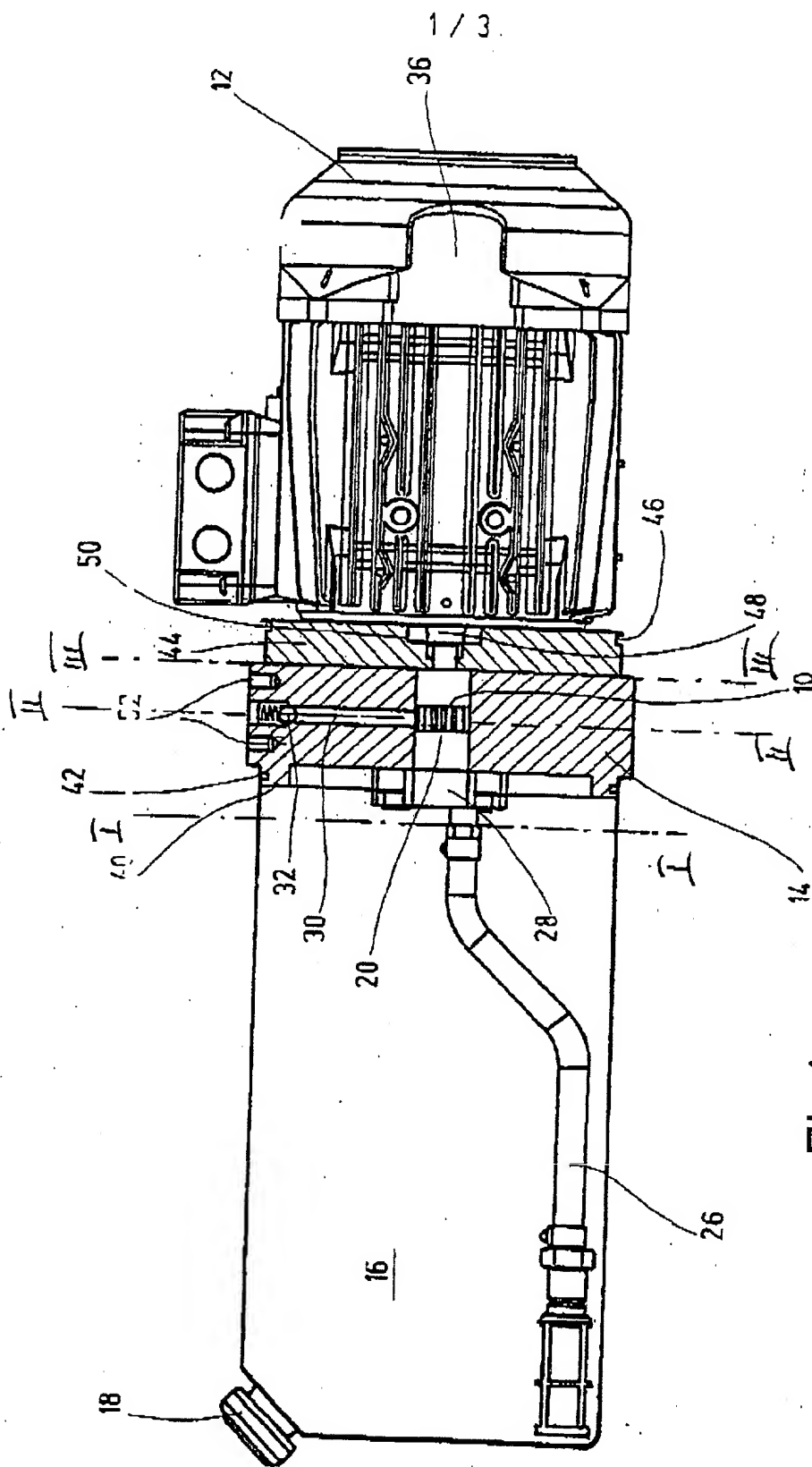


Fig. 1

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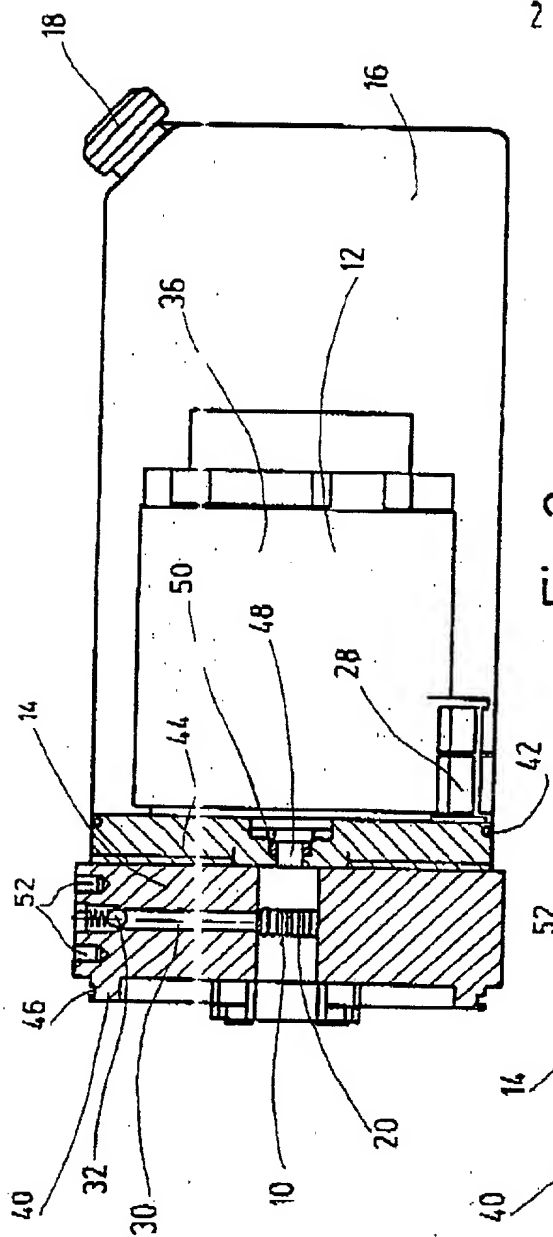


Fig.2

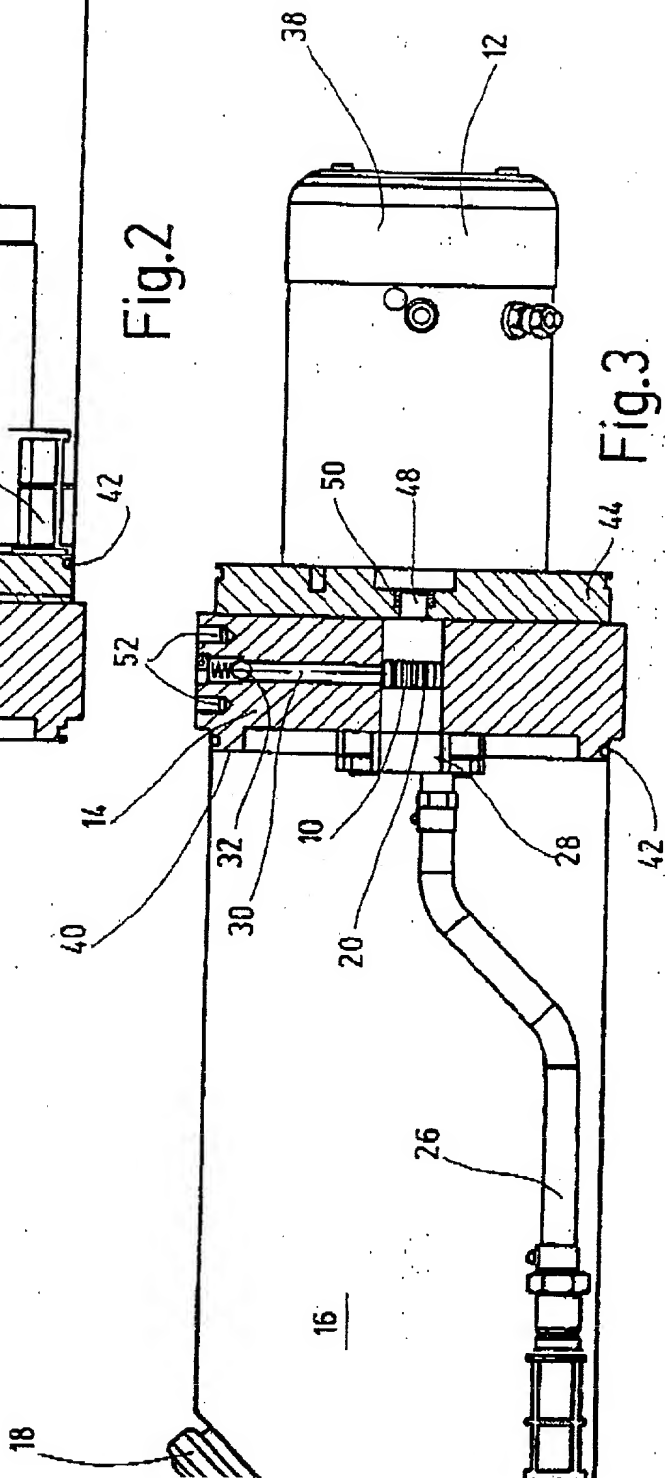


Fig.3

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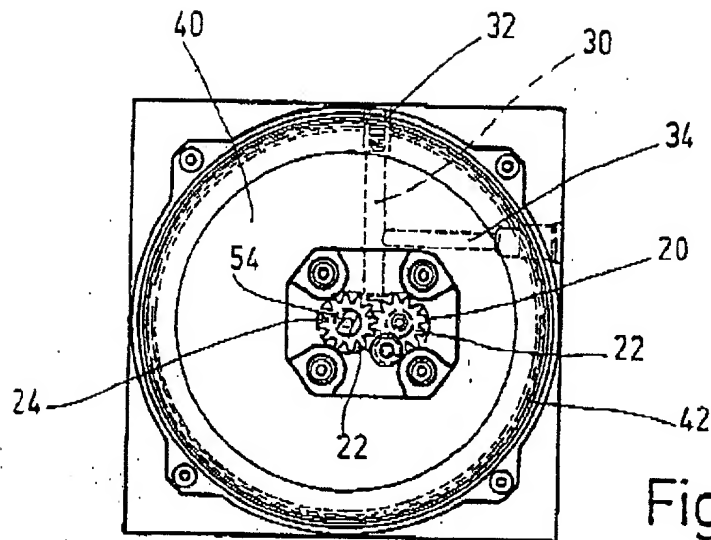


Fig. 4

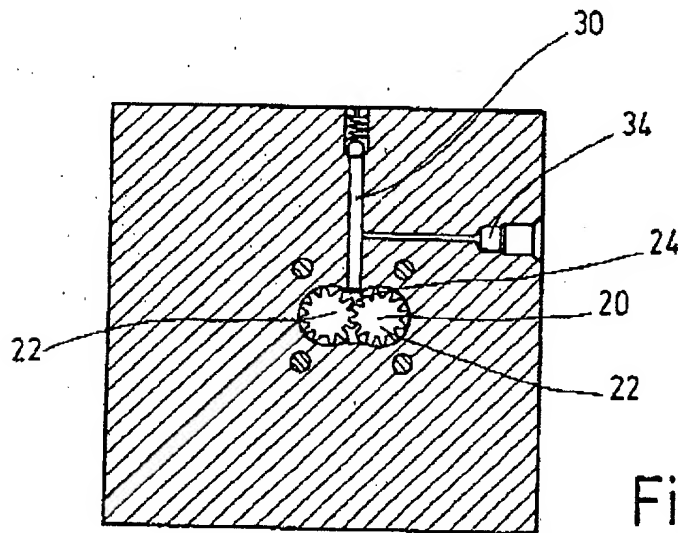


Fig. 5

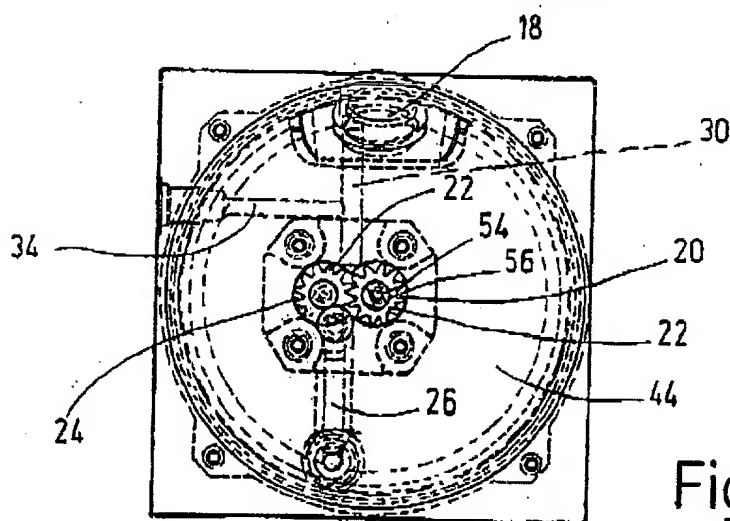


Fig. 6

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GEAR PUMP WITH A DRIVE AND A HYDRAULIC TANK

the specification of which is attached hereto unless the following box is checked:

- ☒ was filed on September 5, 2000
as United States Application Number or PCT
International Application Number
PCT/EP00/08643 and was amended on
_____ (if applicable).

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Priority Not Claimed
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07/09/1999 ☐
(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

David S. Abrams	Reg. No. 22,576	Lance G. Johnson	Reg. No. 32,531
Robert H. Berdo	Reg. No. 19,415	Dean H. Nakamura	Reg. No. 33,981
Alfred N. Goodman	Reg. No. 26,458	Stacey J. Longanecker	Reg. No. 33,952
Mark S. Bicks	Reg. No. 28,770	Joseph J. Buczynski	Reg. No. 35,084
John E. Holmes	Reg. No. 29,392		
Garrett V. Davis	Reg. No. 32,023		

Postanschrift:

Send Correspondence to:

Mark S. Bicks, Roylance, Abrams, Berdo & Goodman, L.L.P.
1300 19th Street N.W., Suite 600 Wash. D.C. 20036

Telefonische Auskünfte: (Name und Telefonnummer)

Direct Telephone Calls to: (name and telephone number)

Mark S. Bicks (202) 659-9076

Vor- und Zuname des einzigen oder ersten Erfinders	Full name of sole or first inventor Harald KLAHM
Unterschrift des Erfinders Datum	Inventor's signature <u>M. KLAHM</u> Date <u>13.2.02</u>
Wohnsitz	Residence <u>St. Ingbert, Germany</u> <u>DEX</u>
Staatsangehörigkeit	Citizenship <u>Germany</u>
Postanschrift	Post Office Address <u>Johannisstr. 22</u>
	<u>66386 St. Ingbert, Germany</u>
Vor- und Zuname des zweiten Miterfinders (falls zutreffend)	Full name of second joint inventor, if any <u>Rüdiger JUNG</u>
Unterschrift des zweiten Erfinders Datum	Second Inventor's signature Date
Wohnsitz	Residence <u>St. Ingbert, Germany</u> <u>DEX</u>
Staatsangehörigkeit	Citizenship <u>Germany</u>
Postanschrift	Post Office Address <u>Theresienstr. 42</u>
	<u>66386 St. Ingbert, Germany</u>

(Im Falle dritter und weiterer Miterfinder sind die entsprechenden Informationen und Unterschriften hinzuzufügen.)

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